Maternal age matters: for a lifetime, or longer

Published Online
May 19, 2015
http://dx.doi.org/10.1016/S2214-109X(15)00034-0

See Articles page e366

Pregnancies in adolescents (10–19-year-olds) and in older women (≥35 years) are hazardous for the mother and the child. Despite an almost universal decline in the adolescent birth rate since 1990,[1] adolescent fertility still accounts for 11% of all births worldwide,[2] with 95% of these births occurring in low-income and middle-income countries (LMICs).[2] In 2014, the average global birth rate among 15–19-year-olds was 49 per 1000 girls (1 in 20), with startling differences in rates between countries (from 1 to 299 per 1000), the highest rates occurring in sub-Saharan Africa.[3] Early marriage remains a strong factor underlying adolescent fertility, with most adolescent childbearing (90%) occurring within marriage,[4] although premarital conception for first births that occur within marriage is common.[1] Recently, attention has shifted towards identifying adverse outcomes in older mothers. In the USA, first-birth rates for women aged 35–39 years increased by nine times from the mid-1970s to 2012 (from 1·7 to 11·0 per 1000).[5] Similar temporal trend data in LMICs are lacking.

As described in *The Lancet Global Health*,[6] the COHORTS Collaboration was able to muster the enhanced statistical power of pooling data from 19 403 participants located in five birth cohorts in Brazil, Guatemala, India, the Philippines, and South Africa, to identify an increased risk of low birthweight, preterm birth, stunting at 2 years, failure to complete secondary schooling, and lower adult height in children of young mothers (≤19 years) compared with mothers aged 20–24 years. Although mothers aged ≥35 years had an increased risk of preterm birth, their children had less stunting and better school progression and adult height attainment, the latter two being novel findings in LMIC settings.

This new evidence is both timely and important. Timely, because it comes at a moment when international mobilisation around the "first 1000 days of life" concept is gaining momentum.[7] Young mothers stand to gain the most from the initiative aimed at improving pregnancy and young child outcomes. Important, because it confirms that the adverse outcomes linked to the extremes of maternal age, mostly described in high-income settings, are as relevant in LMIC settings and worthy of serious public health intervention given their considerable effect on child outcomes. The study makes a strong case for continued and uninterrupted allocation of resources (even in situations of scarcity) through the life cycle, well beyond the current 1000 day focus. As important was the study's exploration of adult outcomes—a global first. Adult fasting glucose concentrations were increased in offspring of young and old mothers, but adult blood pressure was unrelated to maternal age.

Meaningful interpretation of combined data originating from diverse geographical regions, for a primary event (birth) occurring anytime between 1969 (Guatemala, India) and 1990 (South Africa), in predominantly urban settings with very different demographic and socioeconomic profiles, feeding patterns, and availability of services is obviously difficult and problematic. Not surprisingly, the associations between confounding or mediating variables with maternal age and study outcomes varied among the cohorts. The number of participants for whom outcomes data was available diminished sizeably with time. Despite these limitations, there was sufficient homogeneity in the five cohorts for most outcomes to allow meaningful inferences to be drawn.

The mechanisms through which these varied effects of maternal age were mediated are unclear. It is likely that different underlying factors were responsible for preterm birth in younger and older mothers. Understanding these mechanisms is important for the design of more directed public health policy and interventions. For instance, if effects are mostly explained by socioeconomic factors in adolescents, interventions that simply delay age at marriage may have little effect. In the COHORTS study,[6] adjusting for socioeconomic factors attenuated the associations, but they remained significant, indicating that unidentified biological or behavioural factors were at play. Future research exploring the contribution of potential confounders and mediators beyond those examined in the COHORTS study, and of the underlying mechanism(s) for outcomes, is worthwhile. However, this should not distract from getting on with the business of addressing already recognised determinants of poorer outcome that are amenable to immediate intervention.

A recent systematic review,[8] specifically examining LMICs, identified various interventions aimed at reducing adolescent fertility, including improved communication, peer education, school-based

interventions, health counselling, and cash transfer programmes, many offered in combination. Programmes promoting or facilitating school attendance among adolescent girls significantly reduced marriage and childbearing. Conditional cash transfers performed best, reducing the age, and rate of, marriage, total fertility rates, and the prevalence of adolescent pregnancy.[8] Regrettably, interventions in this area are still research-driven with no roll-out of national initiatives in any LMIC.

Concomitant policy changes in other areas may have unintended consequences on adolescent childbearing, such as a decision in Chile to lengthen the school day, resulting in a 5% reduction in adolescent pregnancy prevalence.[9] Introducing legislation on mandatory schooling, statutory rape, or a minimum marriage age may be similarly effective in decreasing adolescent pregnancies. For older mothers, increased surveillance to detect early signs of adverse pregnancy outcome may be the most effective strategy.[10] Ultimately, the challenge is to identify a combination of measures that is feasible within the financial and societal contexts of LMICs. Maternal age matters—for the mother's own health and survival, for her child's wellbeing throughout his or her lifetime, and even longer if the well described intergenerational cycle of growth failure[11] continues into the next generation.

*Haroon Saloojee, *Hoosen Coovadia*
Division of Community Paediatrics, Department of Paediatrics and Child Health, University of the Witwatersrand, Johannesburg, South Africa (HS); Maternal Adolescent and Child Health, School of Public Health, University of the Witwatersrand, Johannesburg, South Africa (HC); and University of Kwazulu-Natal, Durban, South Africa
hcoovadia@match.org.za

We declare no competing interests.

1 United Nations, Department of Economic and Social Affairs, Population Division. Adolescent fertility since the International Conference on Population and Development (ICPD) in Cairo. New York: United Nations; 2013.
2 World Health Organization. Adolescent pregnancy. http://www.who.int/maternal_child_adolescent/topics/maternal/adolescent_pregnancy/en/ (accessed April 28, 2015)
3 World Health Organization. World health statistics 2014. Geneva: World Health Organization, 2014. http://apps.who.int/iris/bitstream/10665/112738/1/9789240692671_eng.pdf (accessed April 28, 2015)
4 World Health Organization. Adolescent pregnancy. MPS notes, volume 1, number 1. Geneva: World Health Organization, 2008.
5 Mathews TJ, Hamilton BE. First births to older women continue to rise. NCHS data brief, no 152. Hyattsville, MD: National Center for Health Statistics, 2014.
6 Fall CHD, Sachdev HS, Osmond C, et al, for the COHORTS investigators. Association between maternal age at childbirth and child and adult outcomes in the offspring: a prospective study in five low-income and middle-income countries (COHORTS collaboration). *Lancet Glob Health* 2015; published online May 19. http://dx.doi.org/10.1016/S2214-109X(15)00038-8.
7 1000 days. http://www.thousanddays.org/ (accessed April 28, 2015).
8 McQueston K, Silverman R, Glassman A. The efficacy of reduced adolescent childbearing in low- and middle-income countries: a systematic review. *Stud Fam Plann* 2013; **44:** 369–88.
9 Kruger D, Berthelon M. Risky behavior among youth: incapacitation effects of school on adolescent motherhood and crime in Chile. *J Public Econom* 2011; **95:** 41–53.
10 Kenny LC, Lavender T, McNamee R, O'Neill SM, Mills T, Khashan AS. Advanced maternal age and adverse pregnancy outcome: evidence from a large contemporary cohort. *PLoS One* 2013; **8:** e56583.
11 Martorell R, Zongrone A. Intergenerational influences on child growth and undernutrition. *Paediatr Perinat Epidemiol* 2012; **26** (suppl 1)**:** 302–14.